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The effect of non-tariff measures (NTMS) on Indonesian pulp and paper exports

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ABSTRACT

Non-Tariff Measures (NTMs) are likely applied by some major trading countries. The NTM policy mostly applies Sanitary and Phytosanitary (SPS) and Technical Barrier to Trade (TBT). Pulp and Paper commodities are some of Indonesia's potential exports facing NTM barriers by a number of major destinations countries. This study is aimed to evaluate the effects of NTMs upon Indonesian pulp and paper export in the main destinations. NTMs are represented by coverage ratio of SPS and coverage ratio of TBT. The effect of NTMs imposition to pulp and paper between Indonesia and its main trade partners is estimated by using a panel data gravity model that is constructed by disaggregated data on bilateral export trade flow of pulp and paper between Indonesia and its main trade partners for the period from 2005 to 2019. The gravity model is estimated by a fixed effects model, Poisson Pseudo Maximum Likelihood, and Hausman Taylor model. The results indicated that the imposition of SPS and TBT of destination countries presented a positive and significant impact upon the Indonesian export of pulp. However, the imposition of SPS and TBT of destination countries presented a negative and significant impact upon the Indonesian export of paper.



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Introduction

Indonesia has a great opportunity in international trade due to natural resources that have the potential to be exported as superior products that are difficult to produce by other countries. The development of increasingly open international trade practices has led to various forms of restrictive trade policies. Non-tariff measurements (NTMs) or non-tariff policies are becoming an important policy tool in international trade as the use of tariff policies decreases. According to the WTO (2012), NTMs owned by each country have various forms and different interests that make NTMs very difficult to evaluate for their impact on social welfare. Meanwhile, there is a view that NTMs are steps to improve social welfare globally (Shepotylo, 2016).

Increased public awareness about health and safety issues encourages the government to regulate product quality and safety with the standards and technicalities contained in the NTMs policy. This action is a response to consumers who have demands to get safe, quality products and environmentally friendly production processes. The Annual Report of the World Trade Organization (2019) states that there is a trend of increasing NTMs policies in the form of Sanitary and Phytosanitary (SPS) and Technical Barrier to Trade (TBT). Every year the WTO receives notifications from member countries that propose SPS and TBT policies.

In 2019 alone, the WTO received 1,757 notifications related to SPS regulations and 3,337 notifications related to TBT regulations.

According to Cadot et al. (2015) SPS policies such as food safety and TBT policies such as environmental protection, have a restrictive or distorting impact on international trade. The NTMs policy will affect trade flows and product prices. Increased restrictive policies, (Soon & Thompson, 2020; Cheong & Tang, 2018)). There are many literatures that analyze the effect of NTMs on commodity trade and have provided mixed results. NTMs have different impacts on a country depending on the country's capabilities, commodities traded, and applicable regulations. So that the NTMs policy has a dual effect, namely positive and negative on the export performance of a country (Disdier et al., 2008).

In the framework of Melitz (2003) NTM[s] will increase production costs, both for domestic and foreign companies. Companies that are more productive will be able to face competition in the midst of an increasing number of competitors in the product market. For example, the use of technology or sanitation makes domestic companies unable to compete, thus creating opportunities for foreign companies to enter the market. In this case, NTMs have a positive impact on intensive trading margins and also have the potential to have an impact on extensive trading margins. Thus, NTMs can have an effect on increasing product prices, which are called compliance costs. As a result, NTMs can create additional variable costs and fixed costs. In this case, variable costs can be in the form of laboratory procurement costs, while fixed costs can be in the form of costs to improve production processes such as equipment, machines, and certificates. Opportunities to increase trade with the NTMs policy can only be exploited by companies that are able to cover the costs of compliance.

Indonesia's Total Trade Balance shows that the realization of trade developments from 2014 to 2019 was dominated by non-oil and gas export products. Export percentage data states that 93% of export commodities are non-oil and gas sectors and 7% are oil and gas sectors (Ministry of commerce, 2020). In the realization of exports from the non-oil and gas sector, there are five leading Indonesian export commodities that contribute the largest export volume, namely palm oil, textiles products, forest products, electronics, and automotive. Forest products are one of the three main commodities with an export realization of 8.19%. Forest resources have so far become one of the capitals of national economic development that have a positive impact on foreign exchange earnings, employment, and encourage regional development.

The industrial sector is one of the largest contributors to Indonesia's Gross Domestic Product (GDP). Its contribution reaches 19.52% of total GDP (Statistik, 2020). One of the industrial clusters that grew optimally was the pulp and paper industry at 8.86%, which was in line with increasing foreign demand. Meanwhile, exports from the industrial sector were recorded at USD 126.57 billion and accounted for 75.5% of Indonesia's total exports. One of them came from the paper and paper goods industry which earned USD 7.27 billion of foreign exchange or around 5.74%. Based on export data, the paper industry was ranked first and the pulp industry ranked third for exports of forest products during 2011-2017. In 2017, the two industries contributed USD 5.8 billion of foreign exchange to the country, of which USD 2.2 billion came from pulp exports and USD 3.6 billion came from paper exports to major export destination countries.

The pulp and paper industry is closely related to other industries including the food and beverage industry, the printing industry, and the packaging industry. This industry is one of the national industries that has strong competitiveness in the global market. The pulp and paper industry managed to rank first in ASEAN and ranked eighth in the world for the pulp industry while the paper industry was ranked sixth (BBPK, 2020). This means that ASEAN countries are highly dependent on Indonesian pulp and paper products. This stems from the achievement of the pulp and paper industry's performance, totaling 88 company permits, consisting of 3 pulp industries, 8 integrated pulp and paper industries, and 77 paper industries that make a significant contribution to the national economy which is a labor-intensive and export-oriented sector (Ministry of Industry., 2019). The pulp and paper industry is estimated to absorb as many as 260 thousand direct workers and 1.1 million indirect workers. Meanwhile, the world's demand for pulp and paper continues to increase to date. Demand for paper reaches around 394 million tons per year and continues to increase to reach 490 million tons in 2020. This condition is an opportunity for Indonesia as a pulp and paper producer to compete in the world pulp and paper market.

Based on the national industrial policy as stated in Government Regulation no. 14 of 2015 concerning the National Industrial Development Master Plan 2015-2035, the pulp and paper industry is one of the sectors that receive priority in its development. This is supported by the Ministry of Industry's efforts to include the pulp and paper industry in the industrial sector group that gets competitive gas prices in Presidential Regulation no. 121 of 2020 concerning Natural Gas Pricing. Meanwhile, on the upstream side, the industry plans to accelerate the development of Industrial Plantation Forest (HTI) which is expected to achieve the target of meeting the needs of the pulp and paper industry. This plan was submitted by the Indonesian Forest

Entrepreneurs Association(2016)and has been divided into 4 periods from 2016 to 2035 with construction at three points namely new factories, replanting, and cumulative plants. Plans for the construction of new plants from 2016 to 2035 are not planned for permanent development in the planted area of 1,163,814 hectares. From the development plan, replanting has increased in 2016 with plans for replanting of 1,818,441 hectares until 2035. development area of 5,114,914 hectares. The development plan for cumulative plants planned for the first period of 2016 is an area of 3,344,743 hectares up to an area of 8,000,000 hectares planned for 2035.

The research problem can be seen from the Government of Indonesia which is aware that the pulp and paper sector has a comparative advantage. Indonesia's advantage is that the raw material planting period only takes 5 years to harvest, while other countries take 20 to 40 years (APHI, 2016). Then, the area of Industrial Plantation Forest (HTI) allocated for the pulp and paper industry as shown in Table 1.1 as well as the tropical climate are factors that support the availability of raw materials in large quantities, allowing plants to grow faster (Ministry of Industry, 2018). In the long term raw materials such as Acacia and Eucalyptus are available in large quantities. Then Indonesia's comparative advantage in producing pulp and paper is supported by endowment factors such as raw material costs, labor costs, and energy costs which are relatively cheaper than other countries. This makes Indonesia less dependent on imports of raw materials. This strength is what makes the Indonesian pulp and paper industry market penetration to the international market. The purpose of this study was to determine the effect of Non-Tariff Measures (NTMs) on Indonesian Pulp and Paper Exports.

Method

Data Analysis and Processing Method

The method used in this research is descriptive and quantitative analysis method. The research data uses secondary data sourced from several agencies related to research such as the Ministry of Industry, UNCTAD, Trademap, CEPII, literature studies through data collection sourced from books and literature. A quantitative analysis method that uses a gravity model with Fixed Effects (FE) estimation. Then to keep the observations at zero and overcome the problem of heteroscedasticity, the Poisson Pseudo Maximum Likelihood (PPML) approach is used. Furthermore, to address issues related to endogeneity in trade policy analysis, the Hausman Taylor (HT) approach is used.

Gravity Model with Fixed Effect Estimation for Pulp and Paper Commodities

The gravity model is often the main tool for researchers who analyze the effect of a policy on international trade performance (Shepherd et al., 2019). The gravity model makes it possible to estimate the effect of trade policies on a country's export performance. Several findings using the gravity model have succeeded in capturing the regularities in trade patterns and the influence of policies on international trade by directly linking trade flows with regions, time periods, sectors, economic sizes, and distances. This study uses a gravity model with a fixed effect estimation method which is assumed to have a constant influence from the error term. Factors causing heterogeneity in each individual are assumed to be constant throughout the observation time. Then the fixed effect estimate captures the effect size and controls for unobserved country-specific heterogeneity and controls for events at a certain time (Santeramo et al., 2019).

To estimate the effect of policies such as non-tariffs on international trade, gravity model equations are included to measure and capture policy factors as explanatory variables. The extended gravity model is written as follows:

$$\ln EX_{ijt} = \alpha + \beta_1 \ln Y_{jt} - \beta_2 \ln D_{ij} + \beta_3 NTM_{ijt} + cX + \varepsilon_{ijt} \quad (3.1)$$

where EX_{ijt} is the export value of country i to j in year t ; Y_{jt} is the GDP of country j in year t ; D_{ij} is the distance between countries i and j ; NTM_{ijt} is the non-tariff measurement policy of country j in country i in year t ; X is a set of variables that can also affect trade ε_{ijt} is an error term.

Therefore, the econometric model used to analyze the effect of NTMs policies on pulp export performance in this study is

Model 1

$$\ln EXP_{ijt} = \beta_0 + \beta_1 CRSPS_{ijt} + \beta_2 CRPTBT_{ijt} + \mu_{ijt} \quad (3.2)$$

Model 2

$$\ln EXP_{ijt} = \beta_0 + \beta_1 CRSPS_{ijt} + \beta_2 CRPTBT_{ijt} + \beta_3 \ln GDP_{jt} + \beta_4 \ln POP_{jt} + \beta_5 \ln EDIST_{ijt} + \beta_6 \ln RER_{ijt} + \mu_{ijt} \quad (3.3)$$

Where EXP_{ijt} is the value of Indonesian pulp exports to importing country j in year t (US dollar); $CRSPSPS_{ijt}$ is SPS coverage ratio of importing country j to Indonesian pulp in year t (%); $CRPTBT_{ijt}$ is the coverage ratio of TBT of importing country j to Indonesian pulp in year t (%); GDP_{jt} is the Gross Domestic Product per capita of the importing country j in year t (USD/Soul); POP_{jt} is the population of importing country j in year t (people); $EDIST_{ijt}$ is the distance between Indonesia's economy and the importing country j (Km); RER_{ijt} is the real exchange rate of importing country j against Rupiah in year t (Rupiah/LCU); \ln is the natural logarithm; μ_{ijt} is an error term.

The econometric models used to analyze the effect of NTMs policies on paper export performance are:

Model 1

$$\ln EXK_{ijt} = \beta_0 + \beta_1 CRKSPS_{ijt} + \beta_2 CRKTBT_{ijt} + \mu_{ijt} \quad (3.4)$$

Model 2

$$\ln EXK_{ijt} = \beta_0 + \beta_1 CRKSPS_{ijt} + \beta_2 CRKTBT_{ijt} + \beta_3 \ln GDP_{jt} + \beta_4 \ln POP_{jt} + \beta_5 \ln EDIST_{ijt} + \beta_6 \ln RER_{ijt} + \mu_{ijt} \quad (3.5)$$

EXK_{ijt} is the value of Indonesian paper exports to importing country j in year t (US dollars); $CRKSPS_{ijt}$ is the coverage ratio of SPS of importing country j to Indonesian paper in year t (%); $CRKTBT_{ijt}$ is coverage ratio of TBT of importing country j to Indonesian paper in year t (%); GDP_{jt} is the Gross Domestic Product per capita of importing country j in year t (USD/Soul); POP_{jt} is the population of importing country j in year t (Soul); $EDIST_{ijt}$ is the distance between Indonesia's economy and the importing country j (Km); RER_{ijt} is the real exchange rate of importing country j against Rupiah in year t (Rupiah/LCU); \ln is the natural logarithm; μ_{ijt} is an error term.

Hausman Taylor Model

One of the biggest challenges in obtaining trade policy analysis is the problem of endogeneity in the estimation model. It is possible that trade policy may be correlated with unobservable cross-sectional trading costs. It is possible that trade policy variables contain reverse causality, where a country has significant bilateral trade relations with its trading partners or the government imposes NTMs on sectors that have an important role for domestic consumers and producers (UNCTAD, 2017). Fixed effects exclude variables that are constant with time and ignore variations between individuals. The Hausman Taylor method can solve these two problems and overcome the problem of endogeneity with the Instrumental Variable Technique (Yotov et al., 2016), where several covariates are correlated with μ_i , but none of them are correlated with ε_{it} . HT uses an exogenous time-variant regressor as an instrument ($T+1$) as the mean and deviation from the mean. HT uses exogenous variables (X_{1it} and Z_{1it}) as instruments.

This method allows NTMs in the form of SPS and TBT coverage ratios to be endogenous time variant variables and are instrumented by endogenous time invariant variables such as geographic distance. Then market size such as a population variable becomes an exogenous time variant variable and is instrumented by the common region as an exogenous time invariant variable (Shepotylo, 2016). Estimate HT with the following equation:

$$\ln EXP_{it} = \beta_0 + \beta_1 \ln POP_{1it} + \beta_2 CRSPSPS_{2it} + \beta_3 CRPTBT_{2it} + \delta_1 Dreg_{1it} + \delta_2 \ln Dist_{2it} + \mu_i + \varepsilon_{it} \quad (3.6)$$

where $\ln EXP_{it}$ is the dependent variable of the value of Indonesian pulp exports to importing countries j ; $\ln POP_{1it}$ is an exogenous variable, time variant variable is assumed to be uncorrelated with μ_i ; $CRSPSPS_{2it}$ and $CRPTBT_{2it}$ are endogenous variables, time variant variable is assumed to be correlated with μ_i ; $Dreg_{1it}$ is an exogenous variable, the time invariant variable is assumed to be uncorrelated with μ_i ; $\ln Dist_{2it}$ is an endogenous variable, time invariant variable is assumed to be correlated with μ_i .

$$\ln EXK_{it} = \beta_0 + \beta_1 \ln POP_{1it} + \beta_2 CRKSPS_{2it} + \beta_3 CRKTBT_{2it} + \delta_1 Dreg_{1it} + \delta_2 \ln Dist_{2it} + \mu_i + \varepsilon_{it} \quad (3.7)$$

where $\ln EXK_{it}$ is the dependent variable of the value of Indonesian paper exports to the importing country j ; $\ln POP_{1it}$ is an exogenous variable, time variant variable is assumed to be uncorrelated with μ_i ; $CRKSPS_{2it}$ and $CRKTBT_{2it}$ are endogenous variables, time variant variable is assumed to be correlated with μ_i ; $Dreg_{1it}$ is an exogenous variable, the time invariant variable is assumed to be uncorrelated with μ_i ; $\ln Dist_{2it}$ is an endogenous variable, time invariant variable is assumed to be correlated with μ_i .

Poisson Pseudo Maximum Likelihood

The use of OLS is a technique that is widely used to estimate various estimates of gravity equations. The disadvantage of the OLS approach is that it cannot account for zero trade flows. Such observations are excluded from the OLS model because the zero logarithm is undefined. The Poisson Pseudo Maximum Likelihood (PPML) approach is used by Silva & Tenreyro (2011), to estimate the gravity model if there is a zero-value trade flow by exponentiating the variable so that it becomes non-linear. Then the PPML approach can overcome the problem of heteroscedasticity which can cause the estimation of trade costs and trade policies to be biased and inconsistent (Santeramo, 2019). Estimates with PPML ensure that the results issued are consistent with the results of fixed effects ((Fally, 2015; Shepherd et al., 2019). PPML estimation with the following equation:

Model 1

$$EXP_{ijt} = \exp [\beta_0 + \beta_1 CRPS_{ijt} + \beta_2 CRPTBT_{ijt}] \times \mu_{ijt} \quad (3.8)$$

Model 2

$$EXP_{ijt} = \exp [\beta_0 + \beta_1 CRPS_{ijt} + \beta_2 CRPTBT_{ijt} + \beta_3 GDP_{jt} + \beta_4 POP_{jt} + \beta_5 EDIST_{ijt} + \beta_6 RER_{ijt}] \times \mu_{ijt} \quad (3.9)$$

where EXP_{ijt} is the value of Indonesian pulp exports to importing country j in year t (US dollar); $CRPS_{ijt}$ is the coverage ratio of the SPS pulp of the importing country j Indonesia in year t (%); $CRPTBT_{ijt}$ is the coverage ratio of pulp TBT of importing country j to Indonesia in year t (%).

Model 1

$$EXK_{ijt} = \exp [\beta_0 + \beta_1 CRKSPS_{ijt} + \beta_2 CRKTBT_{ijt}] \times \mu_{ijt} \quad (3.10)$$

Model 2

$$EXK_{ijt} = \exp [\beta_0 + \beta_1 CRKSPS_{ijt} + \beta_2 CRKTBT_{ijt} + \beta_3 GDP_{jt} + \beta_4 POP_{jt} + \beta_5 EDIST_{ijt} + \beta_6 RER_{ijt}] \times \mu_{ijt} \quad (3.11)$$

where EXK_{ijt} is the value of Indonesian paper exports to importing country j in year t (US dollars); $CRKSPS_{ijt}$ is the SPS coverage ratio of paper of the importing country j Indonesia in year t (%); $CRKTBT_{ijt}$ is the coverage ratio of paper TBT of importing country j to Indonesia in year t (%); GDP_{jt} is the Gross Domestic Product per capita of importing country j in year t (USD/Soul); POP_{jt} is the population of importing country j in year t (People); $EDIST_{ijt}$ is the distance between Indonesia's economy and the importing country j (Km); RER_{ijt} is the real exchange rate of importing country j against Rupiah in year t (Rupiah/LCU); μ_{ijt} is an error term.

Results and Discussions

On-Tariff Measures on Indonesian Pulp and Paper Commodities

Non-Tariff Measures on Pulp Commodities

The increasing influence of the NTMs policy on Indonesian pulp products can be seen from the increasing value of the coverage ratio. Based on Figure 4.1, the SPS policy on pulp commodities is implemented by China and India. However, in 2015-2016, China did not import pulp products affected by SPS so that the export value was zero. Then in 2017-2019, China imported pulp products that had an SPS coverage ratio of 100% for all pulp products imported from Indonesia. Likewise, India imposed an SPS policy on Indonesian pulp products, but in 2016, 2018, 2019 Indonesia's trade to India in pulp products was worth zero. In 2015 and 2017, India's SPS coverage ratio was 100% and 45%, respectively. Meanwhile, Japan, South Korea, Bangladesh and Vietnam do not impose SPS policies on Indonesian pulp products.

Then in Figure 4.2, the use of the TBT policy based on the coverage ratio value for pulp commodities is applied constantly by China, Japan, South Korea, and Bangladesh in 2015-2019. The most widely used TBT policy was in China and Bangladesh from 2015 to 2019 with a value of up to 100%. Japan implemented the TBT policy in 2015 with a value of 99% and then decreased in 2016 with a value of 88%. Then South Korea imposed a TBT policy on Indonesian pulp products starting in 2016. Meanwhile, India in 2015 and 2019 had a value of 0% because exports in that year were zero. Similar to Vietnam, in 2015 there was a TBT policy, but the export value of pulp products was zero so that the TBT coverage ratio value was 0%.

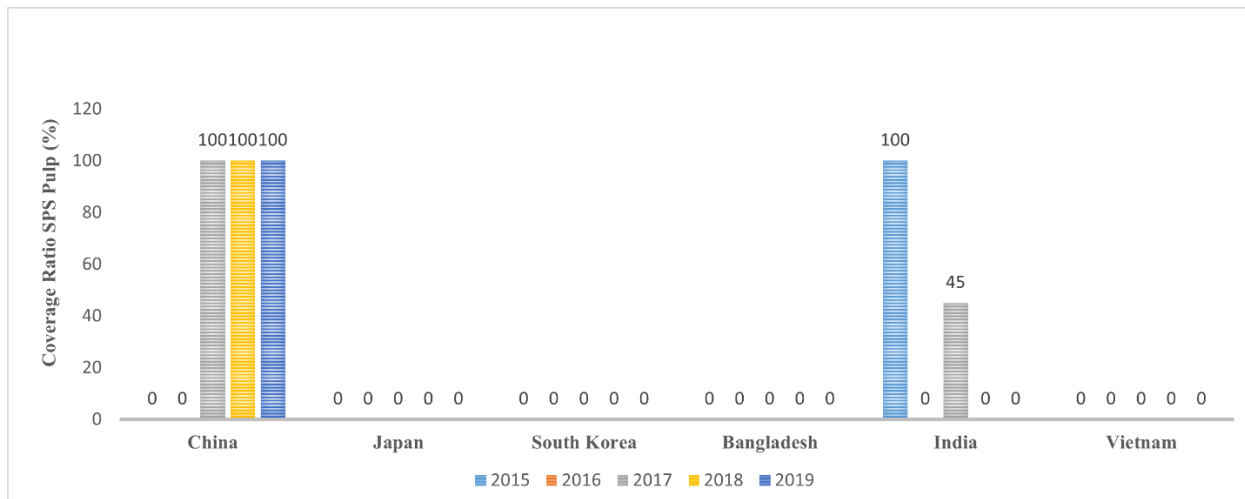


Figure 1. SPS Coverage Ratio of Main Export Destination Countries to Indonesian Pulp Commodities
Source: processed

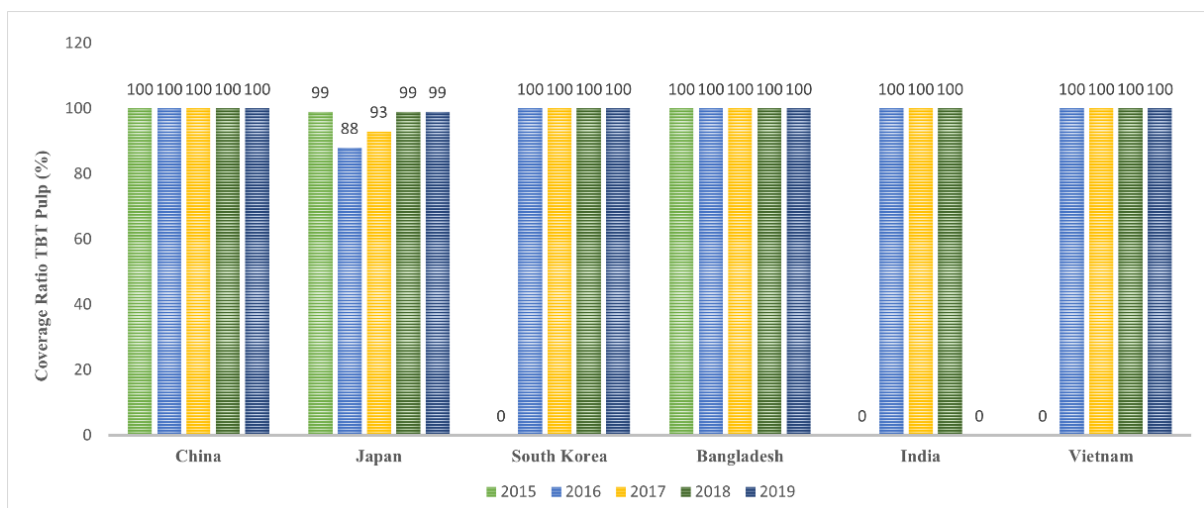


Figure 2. Coverage Ratio of TBT of Main Export Destination Countries to Indonesian Pulp Commodities
Source: processed

China is the largest market importing pulp from Indonesia (Chen et al., 2018). Pulp is 60-65% of the raw material needed by the Chinese paper industry, of which more than a third is imported by China (Guo, 2017). This is the reason why the NTMs policy in the form of SPS and TBT does not hinder or reduce the performance of Indonesia's pulp exports to China. Although China has implemented a TBT policy on Indonesia's pulp export commodity, the value of Indonesia's exports has an increasing trend. Even in 2019, the value of Indonesia's pulp exports to China was USD 2.020 billion or around 72.6 percent of the total value of Indonesia's pulp exports to the world.

The NTMs policy in the form of SPS and TBT comes from the Ministry of Environmental Protection of China to protect the environment by recycling waste in the paper industry which is contained in the National Standards of the People's Republic of China - Environmental Protection Control Standard for Imported Solid Wastes as Raw Materials Waste and Scrap of Paper or Paperboard. NMTs regulations in the form of A83 and B83 require special certification requirements for imported pulp to ensure that it does not have a negative impact on human health or the environment. Then A84 and B84 related to inspection requirements for product inspection in China. Product test reports are published by testing bodies with qualifications of China National Accreditation Service for Conformity Assessment (CNAS), which is China's national accreditation agency responsible for certification, laboratory testing, and inspections (National Standardization Agency, 2016).

Then there is also the SPS A851 policy related to the requirements for traceability of the origin of product materials. China makes regulations regarding external exposure penetrating radiation dose requirements, control requirements for hazardous waste, and control requirements for contained waste. This is done by

China because every year China imports nearly 20 million tons which causes a lot of garbage, pollution, and hazardous waste that has a major impact on China's environment. With the increasing demand and awareness regarding the environment and product safety, the Chinese Government has implemented several regulations related to the requirements that must be met in importing pulp.

India also imposes a NTMs policy in the form of A84 related to pulp product inspection requirements contained in the Quarantine Treatments and Application Procedures: I. Methyl Bromide Fumigation. Then the TBT policy imposed by B42 is related to transportation and storage regulations. Processing, storage and disposal of hazardous substances is prohibited within the Coastal Regulation Zone. As determined by the Ministry of Environment and Forests of India, it is mandatory to implement remedial and restoration measures in relation to the environment.

Then the next NTM is B82 which is related to testing requirements, requiring movement documents and pulp product analysis test reports from the laboratory. The Customs Authority may at any time deem it necessary to conduct random inspections of pulp products entering India. Meanwhile, the TBT B31 policy is related to labeling requirements, where packaging and transportation of waste and scrap must ensure that it has been packaged and labeled based on composition in an appropriate manner for safe handling, storage and transportation in accordance with guidelines issued by the Central Pollution Control Board. Then the TBT B33 policy related to packaging requirements and B84 related to product inspection requirements contained in the Hazardous Wastes (Management, Handling, and Transboundary Movement) Rules.

It can be seen in Figures 4.1 and 4.2 that Japan imposes a TBT policy but does not impose an SPS policy on pulp products imported from Indonesia. Japan imposes B42 TBT regulations regarding transport and storage. Storage must be carried out in a place that meets special requirements. Then take action to prevent waste and scrap from spreading, flowing out, and penetrating underground from storage locations. Furthermore, the TBT B49 policy, production or post-production is related to the processing and disposal of waste and scrap. According to Article 12 (1) of the Waste Management and Public Cleansing Act of 1970, exporters are required to manage their own industrial waste by following the guidelines specified in Waste Management and General Cleaning No. 300 of 1971. Then in the Law for the Control of Export, Import, and Other of Specified Hazardous Wastes and Other Wastes Act no. 108, Japan imposed a TBT B859 policy related to traceability requirements, namely after import approval of products, import movement documents must published. Everyone who transports or disposes of waste and scrap, must record the date of delivery and other information.

Similar to Japan, South Korea only imposes a TBT policy on Indonesian pulp products. TBT regulation B31 related to labeling requirements requires that imported pulp be packaged according to the applicable requirements set by the South Korean Ministry of Environment. Then B33 is a packaging requirement, where everyone who wants to import pulp is obliged to provide information as stipulated. The TBT B85 policy is an information traceability requirement that requires the preparation of movement documents related to imports or so-called import movement documents in connection with the handover related to product takeover.

Furthermore, the TBT B853 policy related to distribution requirements and product location after delivery which requires the preparation of import and export log books, transportation, disposal, and pulp processing. The TBT policy is contained in The Act on the Transboundary Movement of Waste and its Treatment with the aim of promoting international cooperation by preventing environmental pollution caused by the movement of waste between countries and contributing to environmental preservation and improving the quality of people's lives.

Then the main destination country which also only imposed a TBT policy on pulp commodities was Bangladesh, TBT B31 is related to the labelling requirements. Everyone is prohibited from selling merchandise in packaged form, unless there is an information label on the product which includes net weight, price, name of producer and distributor. This policy is contained in the Bangladesh regulations contained in the Standard of Weights and Measures Ordinance, 1982.

Furthermore, Vietnam imposed TBT B83 regulations related to certification requirements. This regulation requires that imported waste and scrap must have a certificate of conformity to environmental standards. Then B84 is related to inspection requirements, imported waste and scrap must be checked first. Furthermore, regulation B89 concerning conformity assessment is related to TBT which is not specified in another section where the product must periodically report to the agency issuing the import eligibility certificate in terms of environmental protection provisions related to import activities. The TBT policies are contained in the Circular on Environmental Protection in the Import of Scraps for use as Production Materials.

Non-Tariff Measures on Paper Commodities

The main export destination countries for paper commodities apply SPS and TBT policies to Indonesian paper commodities. The number of TBT policies is more than the number of SPS policies on paper commodities. The increasing influence of the NTMs policy on Indonesian paper products can be seen from the increasing value of the coverage ratio. In Figure 4.3, the SPS policy was applied consistently by China, Japan, South Korea, and Thailand in 2015-2019. The United States imposed an SPS policy on Indonesian paper products starting in 2017 at 57% and then increasing in 2017 by 62%. Meanwhile, Thailand in 2015 had an SPS coverage ratio of 96% and then continued to decline until 2019 by 80%.

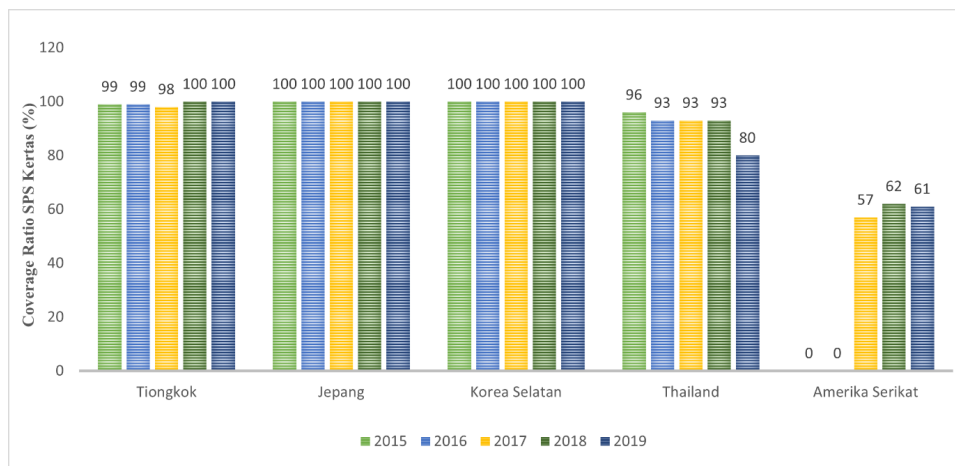


Figure 3. Coverage Ratio of SPS of Main Export Destination Countries to Indonesian Paper Commodities
Source: processed

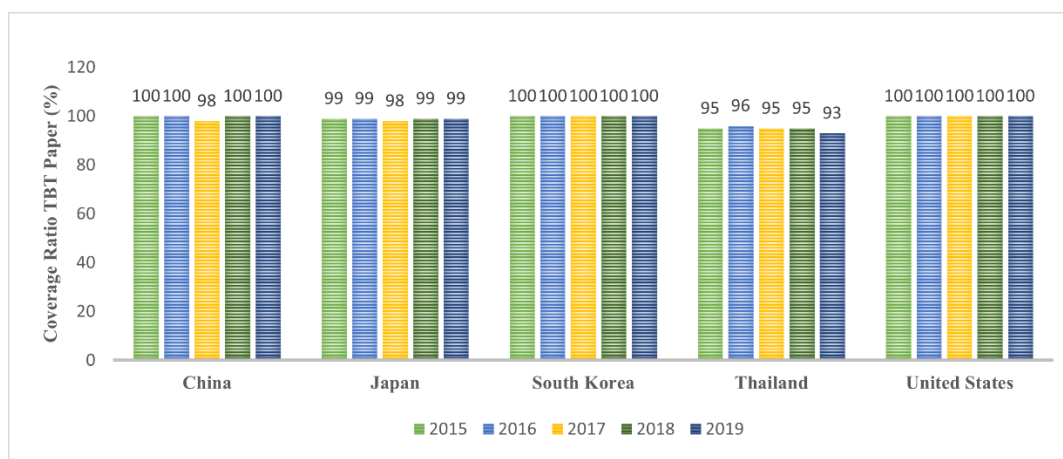


Figure 4. Coverage Ratio of TBT of Main Export Destination Countries to Indonesian Paper Commodities
Source: processed

Figure 4.4 shows the TBT policy on paper commodities that was consistently applied in China, Japan, South Korea, Thailand, and the United States in 2015-2019. The value of Thailand's TBT coverage ratio has the highest value in 2016 at 96%, but decreased in 2019 to 93% for Indonesian paper products. The United States every year during the observation year has imposed a TBT policy so that when compared with the coverage ratio of the United States SPS and TBT, the influence of the United States' TBT policy is greater and constant on Indonesian paper products with a value of 100%.

China is the main market for Indonesian paper with the largest population in the world, namely 1.398 billion people. 2018 was the year with China's highest imports of Indonesian paper, which reached a value of USD 607 million. National Food Safety Standard: Food Contact Paper and Paper Board Materials and Articles is a standard that applies to all types of paper and paperboard materials and goods used for food packaging

This regulation stipulates safety requirements for raw materials, additive limits, hygienic indexes, as well as food packaging paper tests and labels. The SPS policies imposed are A31 related to labeling requirements and A84 related to inspection requirements. Then related to the TBT policy, B21 is imposed, namely the tolerance

limit for residue or contamination by certain substances and B22, which is related to restrictions on the use of certain substances that are limited in food packaging materials. Both are restrictions on substances contained in food packaging to avoid harmful ingredients that may be transferred to food.

Then the B83 policy, regarding certification requirements, which is related to the implementation of special regulations regarding cigarette packaging contained in the China National Tobacco Corporation (CTNC). Certification can be done by providing a test report issued by CNAS. Furthermore, TBT B31's policy on labeling requirements, in which foreign manufacturers must ensure that paper products exported to China comply with the law on paper content safety standards and are responsible for the information contained on the label.

Article 97 requires that imported goods must be labeled and instructed in China and include the country of origin, address, and distributor information. Furthermore, policy B82 regarding test requirements where in article 2 the test results must be consistent with a representative sample sent to the laboratory. After receiving the test report, it must be submitted to the inspection and quarantine agency, namely the Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ).

China's regulations on single-use sanitary products have been gradually strengthened as the market has grown rapidly in recent years. There are standards governing single-use sanitary products in China, namely the policy contained in GB208102006, Bathroom Tissue (including Bathroom Tissue Base Paper). Both are subject to SPS A84 and TBT B84 policies, related to inspection requirements. AQSIQ is responsible for supervising imported goods for single-use sanitary products, including quarantine authorities at all levels in accordance with national standards contained in the Notice on Legal Inspection & Supervision of Disposable Sanitary Products and Notification on Strengthening Legal Inspection & Supervision of Disposable Sanitary Products. Imported.

If a single-use sanitary product is found with damaged packaging, poor hygiene status, exceeds the expiration date, or is mixed with waste, it will be returned or destroyed. Based on data on the quality of China's imported disposable sanitary products in 2013, the percentage of rejected goods for the annual survey was 8.6%, for weight 8.78%, for goods value 11.8%. The reasons for the failure include excessive microorganisms, unqualified packaging, non-standard quality, and failure to provide a Toxicological Test Report (Chemical Inspection and Regulatory Services, 2018)

In the Ordinance for Enforcement of the Food Sanitation Act, Japan imposes a SPS A41 policy, namely microbiological criteria in final products and A85 traceability requirements. The inspection certificate must state that the product has been confirmed not to be infected with any pathogens or diseases at the time of import quarantine. Then the SPS A22 policy on the use of certain substances that are restricted in food and food packaging must meet residue standards.

Furthermore, Japan also imposes a TBT policy in Article 3 of the Household Goods Quality Labeling Act, packaging and packaging materials must meet standard specifications for raw materials and production methods. As a result, Japan imposes a B7 TBT policy regarding product quality, safety or performance requirements as well as B31 labeling requirements, to ensure household goods made of paper include information regarding components, use and storage conditions.

South Korea also applies the SPS related to human health contained in the Standards and Specifications for Utensils, Containers and Packaging for Food Products. Related SPS policy in the form of A19, prohibition or restriction of certain products or substances for reasons of SPS on 4819 products; A21, tolerance limits for residues or contamination by certain substances (non-microbiological); A22, restricted use of certain substances in food and food packaging materials; A31 labeling requirements; A42, hygienic practices during the production process; A64, storage and transport conditions, and A81 product registration requirements.

Then South Korea also imposed TBT on Indonesia regarding the labeling requirements contained in the Labeling Standards for Cleansing & Hygiene Products and Industrial Products Subject to Safety and Quality Mark. These barriers create safety requirements for two types of hazardous chemicals such as formaldehyde and not using chlorine gas as a bleaching agent in the paper-making process. The TBT policy imposed is related to labeling requirements B31 and B21, namely tolerance limits for residues or contamination by certain substances that set the maximum level or tolerance limit for substances, which are used during the production process.

Likewise, Thailand applies TBT to paper commodities including facial tissue paper, table napkins, paper towels and toilet tissue contained in the Types of Packaged Goods, Rules and Procedures for Declaring Quantity of Goods and Maximum Permissible Error. Thailand enforces an SPS A85 policy regarding traceability requirements. Then the implementation of the TBT B31 policy related to labeling requirements.

Each paper product must include a label that includes the name and location of the importer, country of manufacture, size in centimeters, and the amount of paper in one package.

The United States imposed the SPS A89 policy on conformity assessment related to the specific SPS on 4819 products. Then the TBT B21 policy on tolerance limits for certain substance residues where the United States refused to use two hazardous substances contained in paper. It is no longer permitted to use two substances containing perfluoroalkyl and Ammonium bis phosphates as water and oil repellents in the paper-making process. This policy is contained in the Filing of Food Additive.

Then the TBT policy as stated in Hazardous Materials; Miscellaneous Packaging Amendments are imposed in accordance with B31 labeling requirements. The act governs the labeling and definition of the information to be provided including technical and product safety information. Furthermore, TBT policy B82 on testing requirements and B85 for traceability information requirements contained in Shippers-General Requirements for Shipments and Packagings to conduct tests on food packaging and paper bags containing hazardous substances and materials.

Based on the description above, many pulp and paper export destinations impose SPS policies related to labeling, inspection, tolerance limits for residues or contamination by certain substances, as well as the use of certain substances that are limited in food packaging materials that are directly related to human health. The SPS policy encourages Indonesia to be able to meet existing standards and requirements so that these products can still enter the market of the destination country.

While the TBT policy, export destination countries are very concerned about aspects of conformity assessments which include testing requirements, certification requirements, inspection requirements, and information traceability requirements. Then the aspect that is also related to the labeling requirements on the product. The NTMs policy is expected to be able to overcome the problem of asymmetric information on product quality, so that the products traded are confirmed to be safe products for human health and the environment. This can increase consumer confidence and increase demand for products.

Factors Affecting the Flow of Indonesian Pulp and Paper Trade to Export Destination Countries

The NTMs policies imposed by the main destination countries for Indonesian pulp and paper exports were analyzed using a gravity model with Fixed Effects (FE) estimation. Then to maintain the observation that is zero and overcome the problem of heteroscedasticity, the Poisson Pseudo Maximum Likelihood (PPML) approach is used. Furthermore, to overcome problems related to endogeneity in trade policy analysis, the Hausman Taylor (HT) approach is used in this study.

1 Analysis of Pulp . Commodity Regression Model Estimation Results

The gravity estimation model for the pulp commodity contains factors that are thought to affect the export value, including the NTMs policy in the form of SPS and TBT coverage ratios, GDP per capita, population, economic distance, and real exchange rates. Table 4.2 shows the results of the regression of the effect of NTMs policies on the value of pulp exports in two models using the FE, PPML, and HT approaches. The estimation results show that the positive influence of NTMs policies on pulp export trade flows has been proven significantly.

In the model with FE estimation, if the TBT coverage ratio increases by 1%, it will increase the value of Indonesia's pulp exports by 0.093% *ceteris paribus*. Then in the second model by adding independent variables from the gravity model including GDP per capita, population, economic distance, and real exchange rates, the estimation results show that the TBT coverage ratio has a positive and significant effect on increasing Indonesia's pulp exports. With the TBT policy imposed by the main destination countries for Indonesian pulp exports, it can increase the export value by 0.092% at the 1% confidence level.

To overcome the problem of endogeneity in this estimation model, the Hausman Taylor (HT) method is used. This method allows the NTMs policy to become an endogenous time variant variable and is instrumented by an endogenous time invariant variable such as geographic distance. Then market size such as a population variable becomes an exogenous time variant variable and is instrumented by a common region dummy as an exogenous time invariant variable (Shepotylo, 2016). The estimation results show that the TBT coverage ratio variable has a positive and significant effect at the 1% confidence level. With the NTMs policy in the form of TBT imposed by the main destination countries for Indonesian pulp exports, it can increase the export value by 0.092%.

The direction and significance of the TBT coverage ratio in the PPML and HT approaches are also consistent in the two models and the three regression methods, indicating that the resulting estimates are quite strong. The PPML approach which takes into account the observation of zero trade flows and overcomes the problem of heteroscedasticity, makes changes to the previously insignificant SPS coverage ratio variable to be

significant at the 1% confidence level and is positively correlated (Haq et al., 2013). This indicates that every 1% increase in the SPS coverage ratio can increase the value of pulp exports by 0.021%. These positive results are also found in Rindayati & Kristriana (2018) and Crivelli & Gröschl (2012) where SPS can provide information related to product safety to consumers so that market share will increase.

Table 2. Regression Results of FE, PPML, and HT for the Dependent Variable of Pulp Ekspor Export Value

Dependent Variable: Pulp Export Value (lnEXP)					
	FE		PPML		HT
	Model 1	Model 2	Model 1	Model 2	
Coverage ratio SPS (CRP SPS)	0.00359 (0.0129)	0.00254 (0.0118)	0.0218*** (4.8705)	0.0247*** (4.9905)	0.00251 (0.0129)
Coverage ratio TBT (CRP TBT)	0.0937*** (0.0144)	0.0920*** (0.0145)	0.0641*** (1.0505)	0.0632*** (1.0505)	0.0929*** (0.00554)
GDP per Capita (lnGDP)		4.500 (4.252)		0.656 (4.7509)	0.431 (0.365)
Population (lnPOP)		4.436 (14.82)		0.782 (0)	0.366 (1.668)
Economic Distance (lnEDIST)		4.238 (3.949)		0.636 (1.607)	
Exchange rate (lnRER)		-0.052 (0.171)		-2.130 (2.1108)	-0.0601 (0.131)
Dummy Common Region (dreg)					0.0820 (24.43)
Jarak (lnDIST)					-0.807 (45.93)
Cons	4.502*** (0.230)	-65.97 (282.4)			0.926 (394.0)
Observations	480	480	480	480	480
R-Squared	0.407	0.412			
Prob (F-Statistic)	0.0000	0.000	0.000	0.000	0.000

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The same results were also obtained by Virginia & Novianti (2020) and Shah et al. (2014) that the application of NTMs policies in the form of SPS and TBT has a positive influence on the value of exports. It can be interpreted that the use of NTMs policies does not always hinder trade, but can actually increase the flow of export trade. Although such a policy can increase prices due to compliance costs related to conformity assessment requirements, it will ultimately help exporters to gain a comparative advantage. This is because the compliance costs incurred to meet the requirements of NTMs are able to increase consumer confidence in the quality of Indonesian exports by minimizing the occurrence of information asymmetry in products.

In pulp products, the NTMs policy has a positive and significant impact, it is estimated that pulp is a raw material that is needed by the paper industry (Guo, 2017). Pulp and paper are interrelated and are an integrated unit because basically pulp is the main material for making paper (Ningrum, 2006). So that the NTMs policy imposed on pulp is not too strict, when compared to final goods such as paper. Without importing pulp raw materials, the paper industry of export destination countries is unable to maintain and develop its paper industry (Xu, 2017). This is the reason why the NTMs policies in the form of SPS and TBT do not hinder or reduce the performance of Indonesian pulp exports to the main export destination countries.

The NTMs policy encourages better exchange which can increase the compatibility and utility of an item. Where exporting countries will try to meet the requirements of applicable regulations. So that the products traded have been confirmed to be safe products for human health and the environment that have a positive impact on consumer welfare (Josling et al., 2004). Improving the quality of product standards can reduce uncertainty, increase consumer willingness to pay and can reduce the possibility of coordination failure in the trade chain. So that the NTMs policy can facilitate trade by bringing information on imported products, assuming that exporters can overcome the requirements of the NTMs policy (Rindayati & Kristriana, 2018).

Analysis of the Estimation Results of the Paper Commodity Regression Model

In the paper commodity estimation model, there are factors that are thought to affect the value of paper exports including the NTMs policy in the form of SPS and TBT coverage ratios, GDP per capita, population, economic distance, and real exchange rates. Table 4.3 is the estimation result of the gravity panel model with the FE, PPML, and HT approaches which shows the regression results of the effect of NTMs policies on the value of paper exports in the three models. In contrast to the estimation results obtained for the pulp commodity, in the three approaches used, it was found that the SPS coverage ratio and TBT coverage ratio were only significant in the PPML model. The regression model with the PPML approach calculates observations that are zero, so it is found that the SPS coverage ratio and TBT coverage ratio are negatively and significantly correlated. This is thought to be because paper products are final goods so that export destination countries are stricter in implementing NTMs policies.

In the research of Dal Bianco et al. (2016), the negative relationship between SPS and TBT policies on exports is due to higher compliance costs for exporters to meet the stipulated requirements. NTMs can increase the production cost of a product because of the cost of compliance related to conformity assessment requirements for manufacturers Cadot et al. (2015). These costs are not sufficient to overcome the problem of information asymmetry in the product. In other words, the negative effect of SPS and TBT policies on paper products cannot facilitate trade by carrying information from imported products, assuming that exporters cannot overcome the policy requirements of NTMs (Fugazza, 2013; Disdier et al., 2008). Estimation using the FE and HT methods shows that the factor that significantly influences the value of paper exports is GDP per capita. GDP per capita describes a country's income to buy goods and services. Based on the test results, it was found that the GDP per capita variable was positively and significantly correlated. This indicates that each importing country's GDP per capita increases by 1%, it will increase the value of Indonesia's paper exports by 2.31% in the FE model. While in the HT model, the value of paper exports can increase by 1.82%. These results are in line with the research of Ardiyanti & Saputri (2018) and Shepotylo (2016) which explain that GDP per capita has a positive relationship on bilateral trade relations. An increase in GDP per capita of export destination countries will increase the demand for export products.

Table 3. Regression Results of FE, PPML, and HT for Dependent Variables of Paper Export Value

Dependent Variable: Paper Export Value(lnEXK)	FE		PPML		HT
	Model 1	Model 2	Model 1	Model 2	
Coverage ratio SPS (CRK SPS)	0.00779 (0.0165)	0.00795 (0.0161)	-0.00238*** (1.0006)	-0.00656*** (1.0506)	0.00748 (0.0814)
Coverage ratio TBT (CRK TBT)	-0.00166 (0.0122)	-0.00239 (0.0112)	-0.0111*** (7.6007)	-0.00999*** (8.3407)	-0.00231 (0.0709)
GDP per Capita (lnGDP)		2.310* (1.293)		2.690*** (1.6208)	1.818** (0.764)
Population (lnPOP)		31.49** (15.26)		1.178*** (0)	26.3*** (9.500)
Economic Distance (lnEDIST)		-4.152*** (1.207)		0.0022 (9.1707)	
Exchange rate (lnRER)		2.366 (1.874)		-0.0001 (3.2708)	2.386* (1.419)
Dummy Common Region (dreg)					121.6** (54.58)
Distance (lnDIST)					-6.85** (38.74)
Cons	12.45*** (0.327)	-596.6** (285.8)			-1.25*** (481.4)
Observations	600	600	600	600	600
R-Squared	0.309	0.517			
Prob (F-Statistic)	0.0000	0.000	0.4802	0.0716	0.1294

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Then the population has a significant effect on the three methods used. The estimated value of the population variable coefficients are 31.49; 1.17; and 26.30. This indicates that the population in a country affects the demand for paper products, so that the value of Indonesian paper exports can increase along with the increasing market potential of the main export destination countries (Virginia & Novianti, 2020; Santeramo et al., 2019; Rindayati & Kristriana, 2018; Santeramo & Lamonaca, 2019). Thus, the population in the export destination country can have a positive influence on the export value of the traded commodity. In this condition, Indonesia can project an increase in exports by increasing the amount of production to anticipate an increase in market demand due to population growth in the export destination country. Indonesia also plans to increase the number of workers or apply technology to meet domestic and foreign demands (Sari et al., 2014).

Furthermore, the estimation results of the FE model show that the economic distance is negatively and significantly correlated. If the economic distance increases by 1%, the value of paper exports to the destination country will decrease by 4.15%. This is because the distance between Indonesia and export destination countries can increase trade transaction costs so as to reduce the frequency of exports (Virginia & Novianti, 2020; Handoyo, 2019; Santeramo et al., 2019; Shepotylo, 2016); Marina & Mulatsih, 2016); Inayah et al., 2016).

Then the Hausman Taylor (HT) model is used to include time invariant variables and overcome the problem of individual heterogeneity that cannot be observed by FEM and minimize bias caused by endogeneity. This method allows the NTMs policy to become an endogenous time variant variable and is instrumented by an endogenous time invariant variable such as geographic distance. Then market size such as the GDP per capita variable becomes an exogenous time variant variable and is instrumented by the common region as an exogenous time invariant variable (Shepotylo, 2016). The estimation results show that the real exchange rate, dummy common region, and distance variables have a significant effect. The dummy common region variable which has a positive and significant correlation proves that export destination countries located in the Southeast Asia region and are members of ASEAN have better trade relations, so the value of paper exports increased by USD 121.8.

The Rupiah exchange rate against the currencies of paper importing countries has a positive and significant effect indicating that if there is a real exchange rate depreciation of 1%, it will increase the value of paper exports by 2.39%. When the Rupiah exchange rate depreciates, domestic goods in the destination country become relatively cheaper than goods produced in the export destination country. This condition encourages residents of export destination countries to buy more imported goods and conversely Indonesians buy less imported goods. This is in accordance with research by Soon & Thompson (2020) and Sari et al. (2014) who find that if the real exchange rate increases or the currency of the exporting country depreciates, it will result in lower product prices in the exporting country, thereby encouraging product demand and increasing the number of exports.

The effect for NTM is uncertain because it can be ambiguous (can have both negative and positive effects). NTM can inhibit trade due to increased conformity assessment requirements for producers, but can also increase demand because it reduces information costs for consumers (Fugazza, 2013). Theoretical analysis does not provide definitive conclusions about the overall effect related to regulation, further evidence is needed and then we turn to empirical analysis. This is supported by the results of Sari et al. (2014) research which concluded that Indonesia's export trade performance is measured using the RCA value to identify the competitiveness of Indonesian CPO, and the results show that all are more than one. Marina & Mulatsih (2016) research also shows that Indonesia's paper export performance is quite potential to several Latin American countries. This can be seen from all the analysis results which show that paper has strong competitiveness but in several countries paper is in a weak market position. It is suggested that this research can be studied more broadly by analyzing the impact of NTM on countries other than Indonesia, or even comparing the application of NTM from developed countries with non-tariff measures from developing countries. Further research can also add other types of NTM and can be carried out with other available approaches, so that comparisons can be obtained from the methods used previously.

Conclusions

This study aims to analyze the implications of NTMs policies on Indonesian pulp and paper exports, becoming obstacles or opportunities for Indonesian pulp and paper exports. The results showed that the determination of NTMs policies in the form of SPS and TBT coverage ratios by export destination countries for Indonesian pulp commodities had a positive and significant effect. In contrast to paper commodities, the implementation of SPS and TBT policies has a negative and significant impact. This is because pulp is the

basic raw material needed by every country to produce paper. While paper is a final product, so that export destination countries are stricter in implementing the NTMs policy. This illustrates that the effect of implementing the SPS and TBT policies is highly dependent on the commodities traded and the ability to meet the requirements of the NTMs policy. Then, the variables of GDP per capita, population, and real exchange rate are factors that can increase the performance of paper exports in a positive and significant way.

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